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MOST Bus Diagnostics

Model: All

Production: All

OBJECTIVES

After completion of this module you will be able to:

- Diagnose the MOST Bus using module resets
- Store the sequence of the MOST Bus
- Diagnose the E65 MOST Bus

MOST Bus Diagnosis

The MOST network uses a ring bus for data communication between the various modules. Signal transmission is by means of a fiber-optic cable. Data transmission on the ring bus takes place in one direction only. On the the MOST ring, messages can only be transmitted provided the bus ring complete and fully functional.

If for example the power supply or the diode of a control module is defective, the MOST bus is non-operational and no communication is able to take place. Exceptions are the gateway control module (CCC or MASK) and the HUD control module.

CCC/MASK

E60 series vehicles are fitted with either the CCC or the MASK. Either of these control modules are the interface between the MOST bus and the K-CAN.

To diagnose the CCC or MASK:

- CCC (Car Communication Computer) all the control modules with the abbreviation CCC must be selected (e.g. CCC-GW).
- MASK (Multi Audio System Controller) all the control modules the the abbreviation MASK must be selected (e.g. MASK-GW).

Diagnosis Excessive Temperature

If a control module becomes too hot, this control module switches off for up to 10 minutes. This switches the ENTIRE MOST bus down for 10 minutes. After the control module cools down it (and the MOST bus) is functional again.

If this fault, “Deactivation excess temperature”, is stored in the CCC (or MASK) and any of the other MOST control modules there are two possibilities:

- If the fault is ONLY in the CCC (MASK), then this module is responsible for the MOST bus shut down.
- If the fault is stored in the CCC (MASK) and one or more other control modules on the MOST bus, the most likely cause of MOST bus failure is the other control module. However, this does not rule out the possibility that the CCC (MASK) is also defective.

Control Module Resets

Using the DISplus or GT1 a Test Plan may be run to check number of control module resets for each control module on the MOST bus.

A control module with 0 (zero) resets has performed no reset , is not installed in the vehicle, or can not be found with the diagnostic equipment.

The control module with the highest number of resets is the most probable cause of a fault with the MOST bus.

Below is an example of a readout from the DISplus or GT1:

Head-Up Display	15
CD Changer	0
Headset Interface	0
Amplifier	0
Video Module	0
Telephone	0
Satellite Radio	0
Nav System Japan	0
MASK (or CCC)	15

Note: Resets at a rate of less than 10 may be normal for a control module. When the number of resets is less than 10, this is only an indication on the possible cause of a fault. The control module should generally NOT be replaced with less than 10 resets.

MOST Configuration

On the E60, certain control units are always arranged in the same order.

Other control units, on the other hand, can be connected in a different sequence.

Same Sequence

Depending on the equipment configuration, the multi-audio system controller/car communication computer is always followed by the CDC, HUD and then the MOST bus terminal.

Different Sequence

The sequence can change as from the MOST bus terminal. Possible control units include:

- Top HiFi amplifier
- Telephone
- Video module

From the MOST bus terminal, the fibre-optic cable is routed back via the flash plug to the multi-audio system controller/car communication computer.

Store Configuration

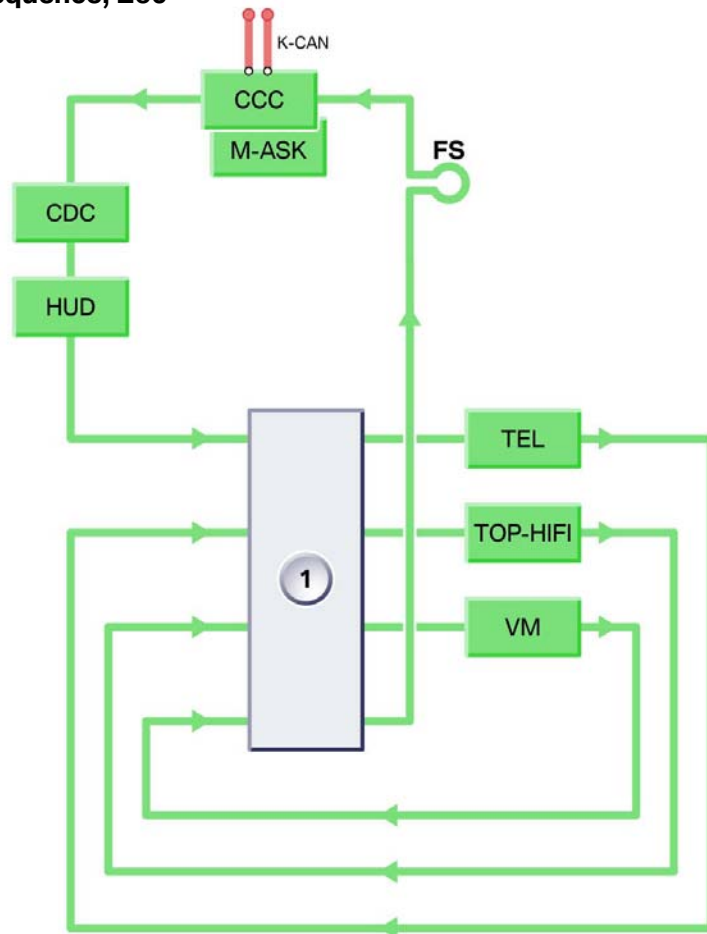
On the E60, the sequence of control units in the MOST system network is identical in the front area of the vehicle. All control units located in the luggage compartment can be connected to the MOST bus terminal in any arbitrary order so that the sequence of the control units can change.

Diagnosis on the MOST bus is only possible over a known sequence of control units in the MOST. When storing the MOST ring configuration, the control units are written in their installed sequence to a registration file. It is first necessary to check whether communication on the MOST bus is possible (stability check).

The configuration is automatically restored after replacing or retrofitting a control unit in the MOST system network. This takes place after programming/encoding with CIP so that the control unit sequence is up-to-date.

The "Store configuration" function is not activated automatically when the control units sequence is changed manually in the area of the luggage compartment (e.g. accident damage repair).

MOST control unit sequence, E60



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Ring Break Diagnosis

Ring break diagnosis is already known from the E65. During ring break diagnosis on the E65, the voltage supply is interrupted directly at the battery.

Contrary to the E65, restart of the MOST users on the E60 is realized via "Transport mode." The following relays are switched off:

- Relay 1 MPM
- Terminal 30g

These relays supply voltage to all control units in the MOST system network. On activating transport mode, the relays are switched off and the voltage supply interrupted.

After the relays have been switched on again and the control units started up, the multi-audio system controller/car communication computer can detect the control units that still have communication capabilities and evaluate the results. Consequently, the BMW diagnosis system specifies a nodal point that provides an indication of the interruption on the MOST bus.

The functional description in the BMW diagnosis system provides detailed information on determining the nodal position on the MOST bus.

Stability Check

On the E60, the antenna tuner and the audio system controller are located in one unit. The radio is still operable in the stereo and in the HiFi system in the event of a communication fault in the MOST system network. The stability check module was introduced for the purpose of checking the MOST bus in such cases.

Effective operation of the MOST bus on the E60 can be checked with the stability check function.

MOST Control Unit Supply

The "MOST control unit supply" module makes available schematic circuit diagrams and information on the power supply of the MOST control units so that specific information is quickly available as required.

E65 MOST Bus Diagnosis

Fault Symptoms E65

Particularly when carrying out troubleshooting in the MOST system network it is important to know the precise significance of visible and audible symptoms. With this information it is possible to locate and correct faults much faster.

The starting point for locating faults should always be to pose detailed questions relating to the fault to the customer. This information can then be used to formulate initial consideration before the BMW diagnosis system is connected.

The following information should be available to the technician:

- When does the fault occur? E.g. already during engine start or while driving?
- Since when does the fault occur?
- Does the fault depend on temperature? When cold, hot or after longer period of vehicle operation?
- Do several functions fail simultaneously? If so, which?
- Is the fault still present after shutting down and restarting the vehicle?
- Was something switched on or off immediately before the fault occurred?
- Is it necessary to enter the telephone PIN after restarting the system?
- Does the radio/CD need to be switched on separately after restarting the system?
- How often does the system fail?
- How long does audio failure last?
- Can a loud clicking noise be heard in connection with the fault?
- Is the system OK again after switching terminal 15 off and on?
- What was shown on the main screen and in the assistance window?
- Does the control display fail?
- Is the display white or black or does it flicker in connection with the fault?
- Can a status line still be seen?
- What is shown after resetting the MOST bus (last menu, basic menu/start menu, BMW logo)?
- Does the CD changer make a noise after audio failure?

In addition, various factors that could also cause malfunctions in the system should be clarified:

- What control units have already been replaced?
- Did the fault symptom change after replacing control units?
- Was the light intensity reduced for the control units?
- Were the plug connections at the MOST control units checked?
- Was another or new road DVD inserted?
- What road DVD was used?
- Was something retrofitted on the vehicle or a repair carried out?
- To what CIP status (integration stage) does the vehicle correspond?
- Were other-make parts retrofitted in the electrical systems?

Based on the information provided by the customer and after examining any changes in the system it may be possible to determine faults already at this stage.

Why are these statements important? Examples from visual applications:

Creating Images

The control display (CD) contains two control units, i.e. the CD gateway that establishes the connection to the other bus systems and the CD graphics stage that builds up the graphics in the control display. Not all images in the CD are created by the CD graphics stage. All basic menus, submenus and the status line are created by the graphics stage (blue). The map is presented by the navigation computer via RGB lines (red).

Consequently:

If only the map is not displayed but the rest, e.g. the on-board computer, is still visible and if other menus can still be selected via the controller, in all probability the fault will be in the area of the navigation system.

Important: The navigation map can also be displayed on the left-hand side.

Non-Digitized Area

A road map DVD, on which an area is not completely digitized can cause the navigation screen to turn green.

Self-Burnt DVDs

A self-burnt or faulty road map DVD can cause the navigation computer to crash. Also a defective computer can trigger a reset of the navigation system, indicating "Initialization running" in the control display.

Telephone E65

The telephone AF is routed via the MOST bus in the form of light signals to the ASK. The light is converted in the ASK and the AF is output from the speakers by means of a hard-wired electrical signal.

The microphone is connected via copper cables directly to the telephone control unit. Even if an SVS is installed, it does not have anything directly to do with hands-free telephone operation.

SVS is activated when voice commands are executed. The cause of a fault in hands-free operation should be sought in the area of the microphone, telephone and ASK.

If the telephone PIN is necessary after failure of the MOST bus, this indicates that the telephone control unit triggered a reset and in all probability the fault can be rectified by replacing the telephone control unit.

If the MOST bus is blocked, a telephone conversation via the cordless keypad handset should still be possible provided the telephone itself is not defective.

Audio

The two models E60 and E65 differ considerably in the area of the audio systems. These design differences necessitate different assessment methods for the purpose of locating faults.

The ASK is responsible for audio output on the E65. If the vehicle is equipped with a Top HiFi amplifier, the audio signal is sent in the form of a light signal from the audio source to the Top HiFi amplifier and forwarded to the speakers as an electrical signal.

Some of the speakers are activated directly by the ASK and some by the Top HiFi amplifier (LOGIC 7).

If the E65 is equipped with a HiFi amplifier, the sound information is transferred hard-wired to the amplifier.

In connection with the Top HiFi system on the E60, all sound signals are routed from the multi-audio system controller/car communication computer in the form of light signals to the Top HiFi amplifier.

No sound signals are transmitted along fibre-optic cables in connection with the stereo and HiFi systems. The multi-audio system controller/car communication computer itself is responsible for the control of the speakers.

byteflight

As already in the E65 and E85, the byteflight is used in the safety system on the E60/E63. The system was adapted to the specific requirements of the vehicle.

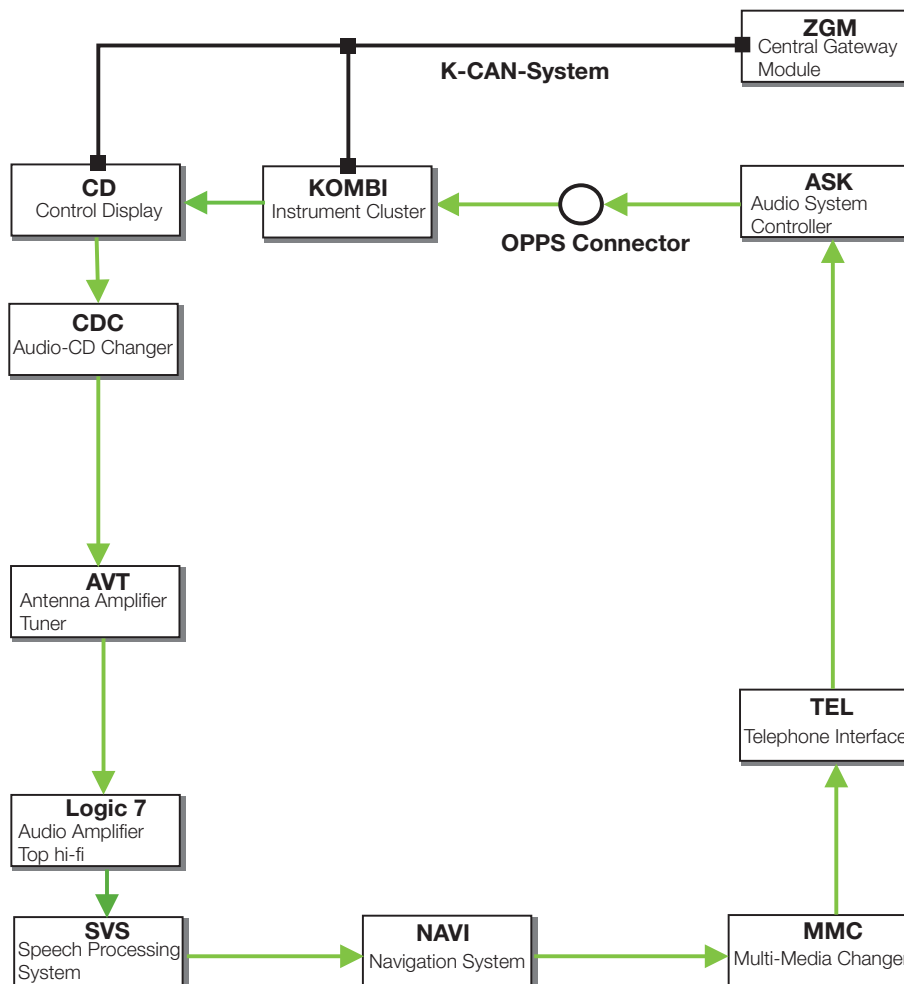
The star-shaped arrangement of the satellites about the SGM (safety and gateway module) is a characteristic feature for the byteflight. The data are transmitted by means of light signals.

Diagnosis

In addition to the test options: fault code memory check, diagnosis check and component activation, this system can also be used to measure the light attenuation to ensure complete operability of the light section.

Light Attenuation

The maximum permissible light attenuation in the byteflight is -20 dB. Values between -3 dB and -8 dB are normally measured in the system. Different methods of contacting must be used depending on the light section to be measured in the system.





Workshop Exercise - MOST Bus

*Install the light attenuation device in the MOST Bus at the Logic 7 amplifier.
One device should be installed in each fiber optic cable going into the Logic 7.*

Set up the OPPS (or OPS) to measure the attenuation of the the light going into the Logic Seven.

Measure the attenuation of the inbound cable. _____

*With the attenuation device begin to increase the attenuation. Watch the readings.
At what db does the sound stop? _____*

Return the attenuation device to the base setting.

Now measure the attenuation of the fiber optic cable leaving the Logic 7.

What is the attenuation. _____

*With the attenuation device begin to increase the attenuation. Watch the readings.
At what db does the sound stop? _____*

Why is this different? _____

How is this helpful in diagnosing MOST Bus problems. _____

Perform MOST Bus Analysis.

Which module reset number indicates a problem? _____

What would be the solution? _____
